Development of Humasorb™, A Lignite Derived Humic Acid for Removal of Metals and Organics

Developer: ARCTECH, Inc.
Contract Number: DE-AR21-95MC32114
Crosscutting Area: ESP

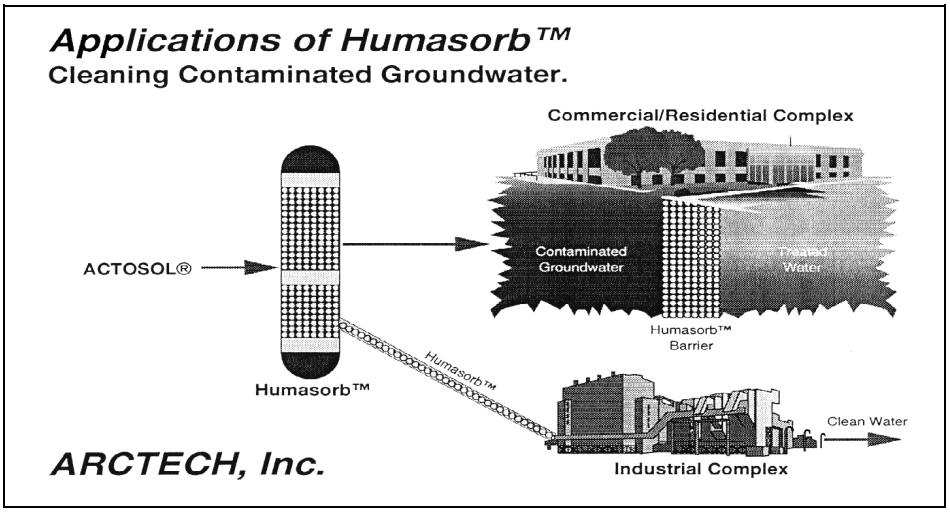
Subsurface Contaminants FOCUS AREA

Problem:

DOE operates large facilities related to the research, development, manufacturing, and fabrication of nuclear weapons, that occupy a total area of 2,800 square miles, and contain numerous sites where groundwater is contaminated with organics, metals, and radionuclides. Clean-up of groundwater currently relies upon conventional treatment using activated-carbon adsorption columns followed by ion exchange. Disadvantages of this technology are that it relies upon sequential treatment requiring expensive materials, and generates multiple waste streams. It also is unsuitable for in situ remediation.

Solution:

A humic acid-based sorbent (HUMASORB™) can treat DOE mixed wastes in groundwater. Both metals and organics can be removed using a single-step process to replace current sequential treatments of mixed wastes.



Benefits:

- Treats groundwater containing multiple contaminants in a single step
- Is lower cost than current technologies
- Generates one waste stream, not multiple ones as with existing technologies
- Wide range of public and private applications
- Minimal generation of secondary wastes
- Responsive to environmental regulatory requirements
- Reduces environmental impacts better than current technologies
- Lessens public and occupational health risks more effectively
- Improves waste management operations

Technology:

HUMASORB™ is a water insoluble humic acid product which has the proven natural ability to adsorb organic material, chelate metal ions,

and capture radionuclides. Properties of humic acid that enable these capabilities include:

- High cation exchange capacity
- Ability to chelate metals
- Ability to adsorb organics

The adsorbent can be utilized in two ways. In one method, the material can be placed into a trench placed in the path of a contaminant plume. The material will form an in situ permeable barrier, removing contaminants as they pass through the HUMASORB™. In another method, the adsorbent can be injected into a permeable soil layer to accomplish the same task. The low cost of the material provides for economical utilization.

Contacts:

ARCTECH is an environmental technologies company whose primary focus is research and development and testing services (biological, chemical, and physical). For over 15 years, ARCTECH researchers have actively developed processes to remediate hazardous and toxic wastes associated with industrial processes. ARCTECH has successfully demonstrated biological and chemical remediation technologies for the treatment of explosives, PAHs, PCBs, and pesticides. The Company created and maintains fully equipped chemistry, biological, and process engineering laboratories, where extensive research is conducted on ways to convert coal to high-valued products. From this research, ARCTECH invented and commercialized a process for organic humic acid based soil conditioners-actosol®. For information on this project, the contractor contact is:

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DOE's Morgantown Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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